MC68HC705E6 EEPROM PROGRAMMER

User's Guide

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1. Introduction

This manual will guide you through the installation of the MC68HC7(05)E6 EEPROM Programmer. MC68HC705E6 programmer has been designed to access EEPROM data of target microcontrollers via PC or in autonomous mode. Available operations are reading, writing, verifying EEPROM data into/from PC or onboard IIC memory AT24C02.

2. Check list and requirements

Hardware requirements

Power supply	- A 12-14 volt/300 mA linear power supply source
Tool	- MC68HC705E6 programmer board
	- Free serial or USB port[1]
Adapters	- 28 SOIC to 28 PDIP programming adapters
	- 28 SOIC to 28 PDIP MC68HC05P3 programming adapter
	- 44 QFP to 28 PDIP MC68HC05E6 programming adapter[2]
	- DIL28W/SOIC28 ZIF programming adapter[3]

[1]Optional (USB – RS232 converter required, see APPENDIX)
[2]Optional
[3]Optional (28 pins, 300mil SOIC devices)

Software checklist

OS	- MS-Windows (Win98, Win2000, WinXP, Win 7)
Software tool -	- Checkpoint LAB MC68HC705E6.exe control software

Additional tool requirements

IIC Memory EEPROM programmer:

- Any accessible programmer (AT24C02)

Package check list

Contents:

- MC68HC705E6 programmer board
- two 28 SOIC to 28 DIP programming adapters
- one 28 SOIC to 28 DIP MC68HC05P3 programming adapter
- PC serial cable

3. Installing

The MC68HC705E6 programmer is designed to access EEPROM data memory of MC68HC7(05)E6, MC68HC7(05)P3 microcontrollers . Supported devices:

- MC68HC705E6 (0H51A)
- MC68HC05E6 (0G72G; 0F28B)
- MC68HC705P3 (1F75B)
- MC68HC05P3 (1E25BH) / MC68HC05P3 programming adapter required /
- X24C01 (Xicor)[o]
- X24C02 (Xicor)[o]

[o]Optional (on board socket for AT24C02)

To understand MC68HC705E6 programmer components meaning see Figure 1 and Table 1

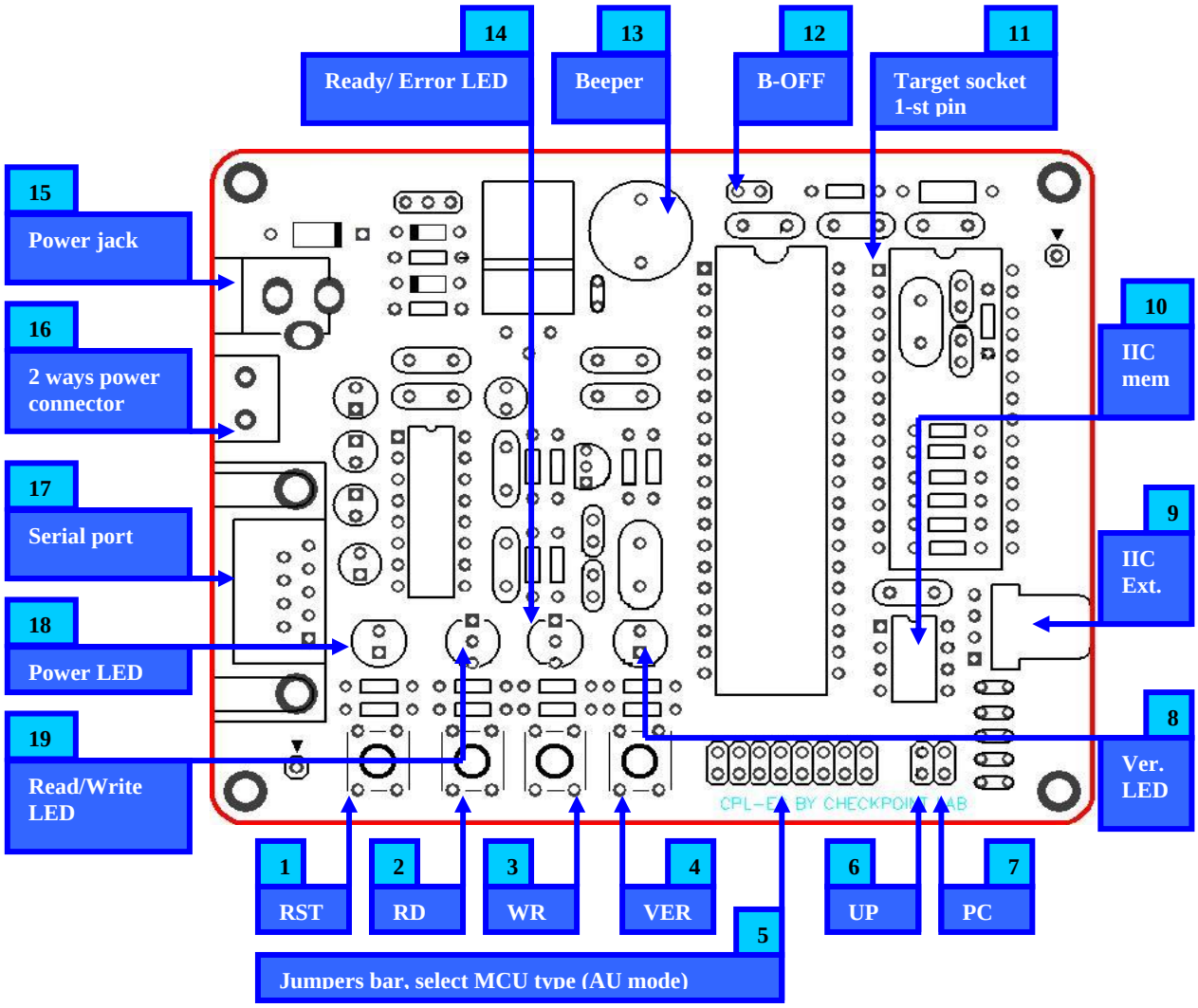


Figure 1

1 – Reset button (RST) : system reset (autonomous mode)
2 – Read button (RD) : read device (autonomous mode)
3 – Write button (WR) : write device (autonomous mode)
4 – Verify button (VER) : verify device (autonomous mode)
5 – Jumpers bar (JP) : select device (autonomous mode)
6 – Update jumper (UP) : upgrade firmware jumper
7 – Personal Computer jumper (PC) : PC /AU control jumper
8 – Verify LED : verify device (autonomous mode)
9 – IIC connector (IIC Ext.) : IIC interface for external programmer
10 – IIC memory (IIC mem.) : IIC AT24C02 EEPROM memory
11 – Target socket : target device socket
12 – Beeper jumper (B-OFF) : beeper OFF jumper
13 – Beeper : error signal speaker
14 – Ready/Error LED : 2 colour ready/error LED
15 – Power jack : DC power supply input
16 – Power connector : DC power supply input
17 – Serial port connector : RS232 serial interface to a host PC
18 – Power LED : power diagnostic LED
19 – Read/Write LED : 2 colour mode of operations LED

Table 1

18. Power LED	POWER LED	Red color led
19. Read/Write LED	READ/WRITE LED	Red/Green colour led
14. Ready/Error LED	READY/ERROR LED	Red/Green colour led
8. Ver. LED	VERIFY LED	Green colour led
1. RST	RESET button	System reset (AU mode)
2. RD	READ button	Read target MCU (AU mode)
3. WR	WRITE button	Write target MCU (AU mode)
4. VER	VERIFY button	Verify target MCU (AU mode)
5. JP3	MC68HC705E6	Mounted; JP4-JP10 left open
5. JP4	MC68HC05E6	Mounted; JP3,JP5-JP10 left open
5. JP5	MC68HC705P3	Mounted; JP3,JP4, JP6-JP10 left open
5. JP6	MC68HC05P3	Mounted; JP3-JP5, JP7-JP10 left open
5. JP7-JP10	Reserved (don't care)	Reserved (don't care)
6. JP11	UPDATE jumper	Normal operate - mounted
7. JP12	PC/ AU jumper	PC – unmounted; AU - mounted
9. IIC Ext.	4 – pins IIC connector	1-+5V; 2- GND; 3- SCL; 4 –SDA
10. IIC mem.	8 – pins socket	AT24C02 IIC memory
11. Target IC socket	28 – pins socket	MC68HC7(05)E6/P3 IC socket
12. B-OFF	Beeper OFF jumper	Normal operate - mounted
13. Beeper	Error message speaker	3 times beep – error occured
15. Power jack	DC input jack	+ 12 V DC supply voltage
16. Power connector	DC input connector	+ 12 V DC supply voltage
17. Serial port	Serial interface connector	PC serial interface

Installing MC68HC705E6 Programmer control software and hardware:

- Navigate CPL CD-ROM : "Install Software" > "Install MC68HC705E6 Programmer", then execute "Setup.exe" file. Follow the setup wizard
- Connect MC68HC705E6 Programmer to the power supply source (12-14 V >=300 mA)
- Attach MC68HC705E6 Programmer to PC serial port
- Make sure that "UP" jumper is mounted (normal operate position) and "PC" jumper is unmounted for serial port control or is mounted for "AU" mode (autonomous mode), if "AU" jumper is mounted pay attention to jumper position (Table 1)
- Install target device into the target socket, notice the orientation of the device, first pin marked (Figure 1)
- Turn ON power supply source, power LED becomes lit (red colour)
- MC68HC705E6.exe control software can be started, if "PC" jumper is unmounted. Otherwise, if "AU" jumper is mounted, M68HC705E6 Programmer will remain in autonomous mode

Table 2

Operation mode	AU (Autonomous mode)	PC (Personal computer) mode
PC jumper	- short	- open

4. Quick start

Once you have obtained MC68HC705E6 Programmer use step-by-step procedure to enter PC MODE:

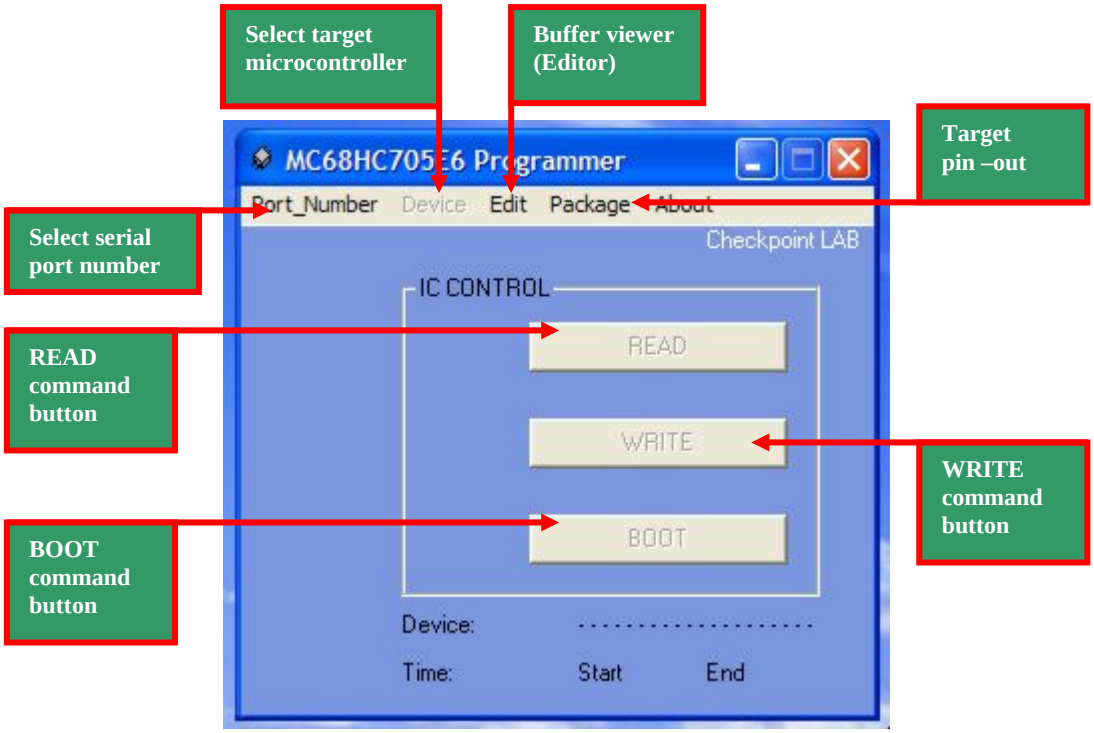


Figure 2

Before applying power to the programmer board, connect the MC68HC705E6 Programmer serial port to one of your PC COM ports with pin-to-pin RS232 cable and unmount "PC" jumper before starting procedure. Make sure B-OFF jumper is mounted.

- Attach serial cable to computer (RS232 or via USB-RS232 converter)
- Place a target microcontroller in the socket on your board according to 1-st pin orientation
- Apply 12 Volts to power jack or 2 ways connector

1. Click on MS-Windows **Start** button
2. Select **MC68HC705E6_Programmer**
3. Click the **Port_Number** menu button to activate Device control
4. Click **Device** menu button after activation
5. Select target MCU
6. Click **BOOT button** to make sure that MCU type is correct.
   Correct respond: "Ready". Wrong respond "Boot Failed"
7. Click **READ button**
8. Click **SAVE button** (Save As window) to save the original dump into a specified file
9. Click **Edit** menu to modify EEPROM memory data
10. Click **WRITE button**
11. Click **OPEN button** to write data from a file to EEPROM of a target microcontroller
12. Click **READ button** and save the dump into an other file, then compare with the original one. Do files match? If there are any errors such is failed boot, wrong data, failed write procedure, you'll hear 3 short beeper signals. Some errors can be fixed by restarting the same operation (Read or Write).

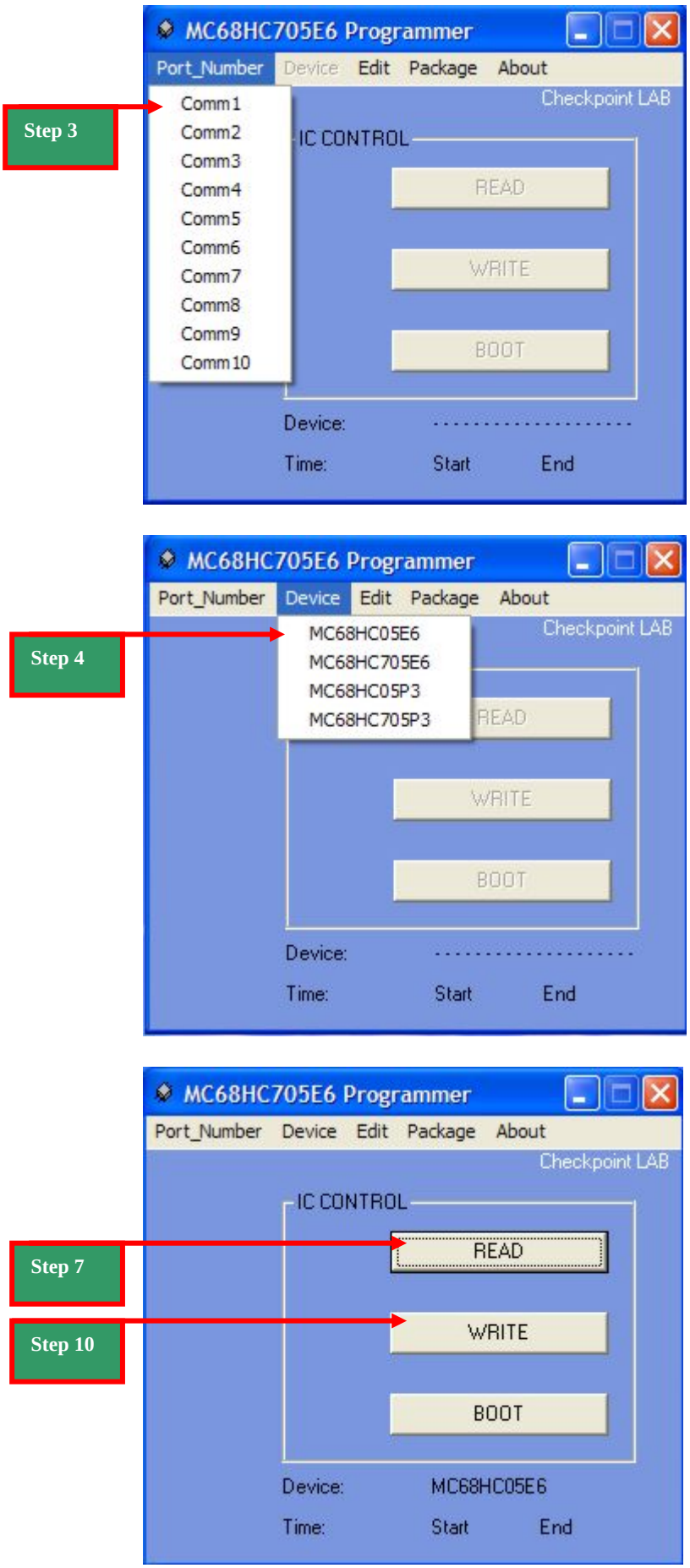

MC68HC705E6 Programmer
Port_Number
Device
Edit
Package
About
Checkpoint LAB
Comm1
Comm2
Comm3
Comm4
Comm5
Comm6
Comm7
Comm8
Comm9
Comm10
IC CONTROL
READ
WRITE
BOOT
Device:
Time:
Start
End
Step 3
MC68HC05E6
MC68HC705E6
MC68HC05P3
MC68HC705P3
Step 4
Step 7
Step 10
MC68HC05E6

Figure 3

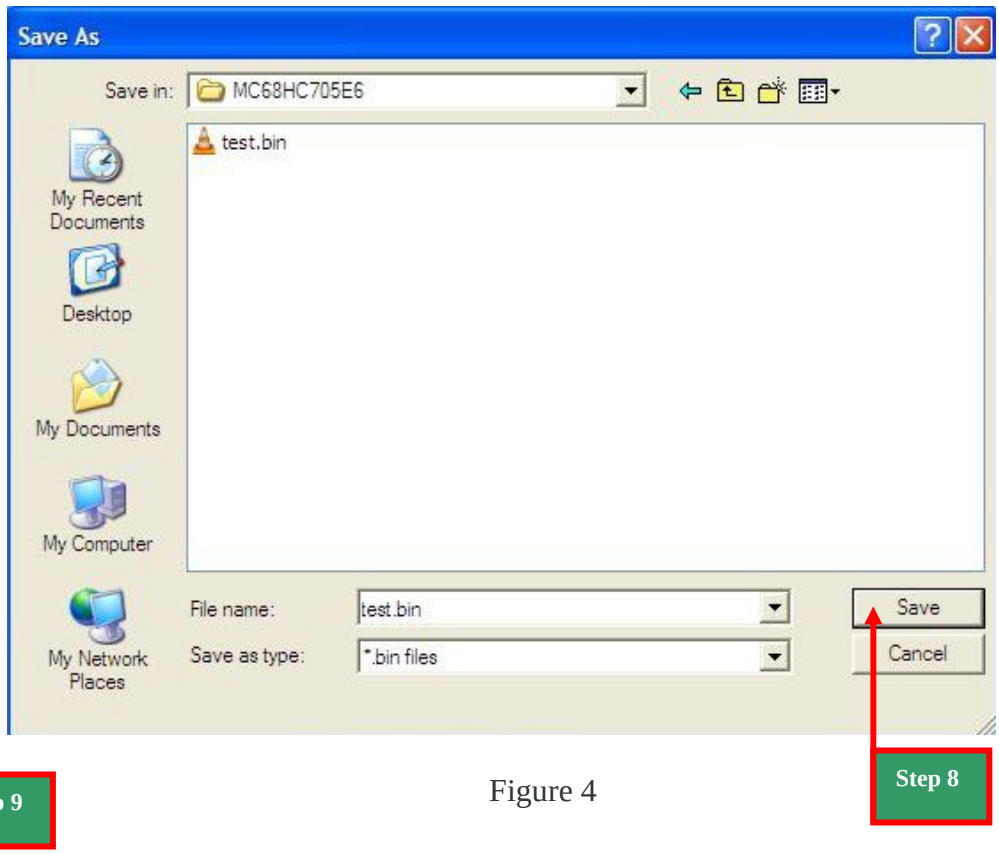


Figure 4

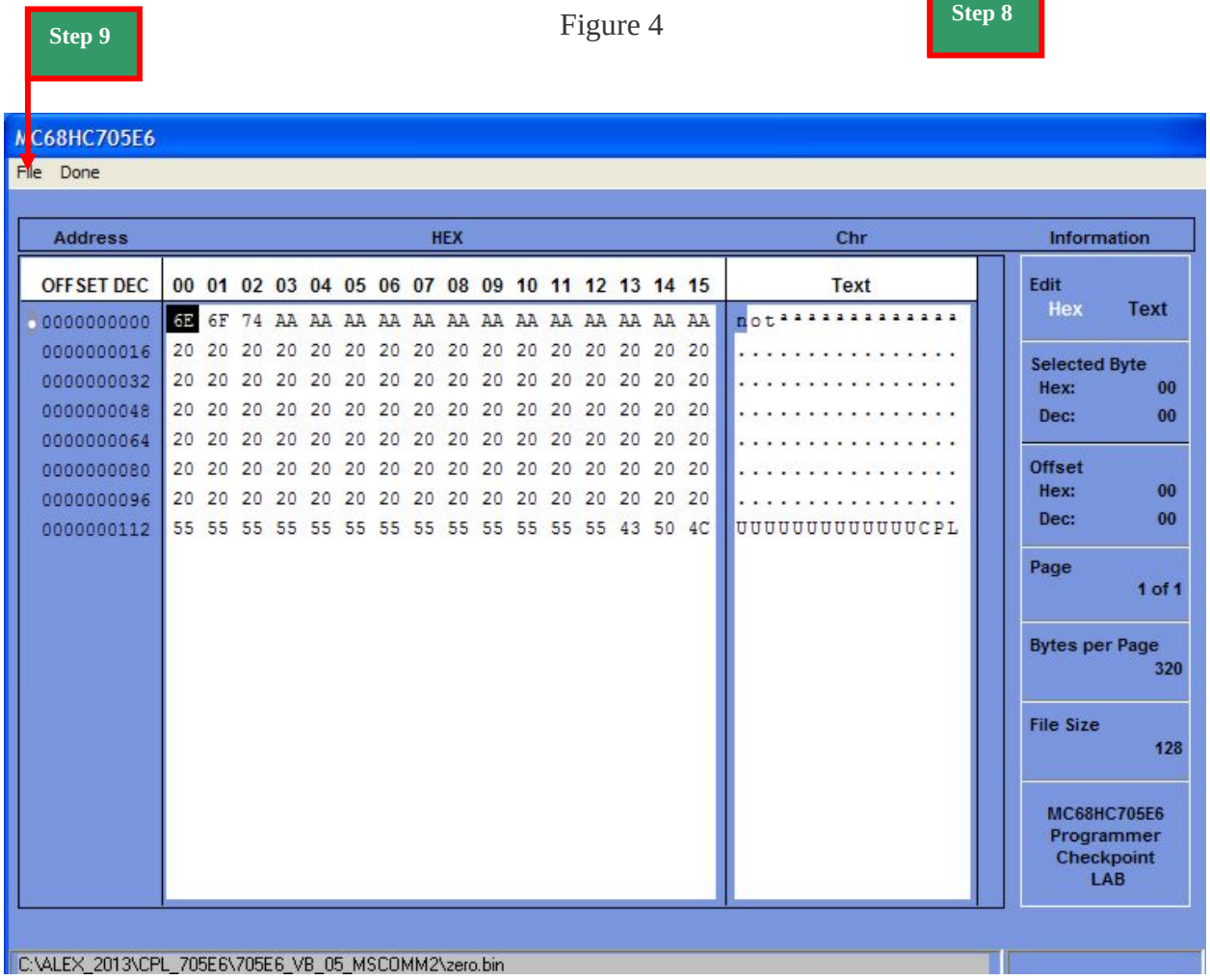


Figure 5

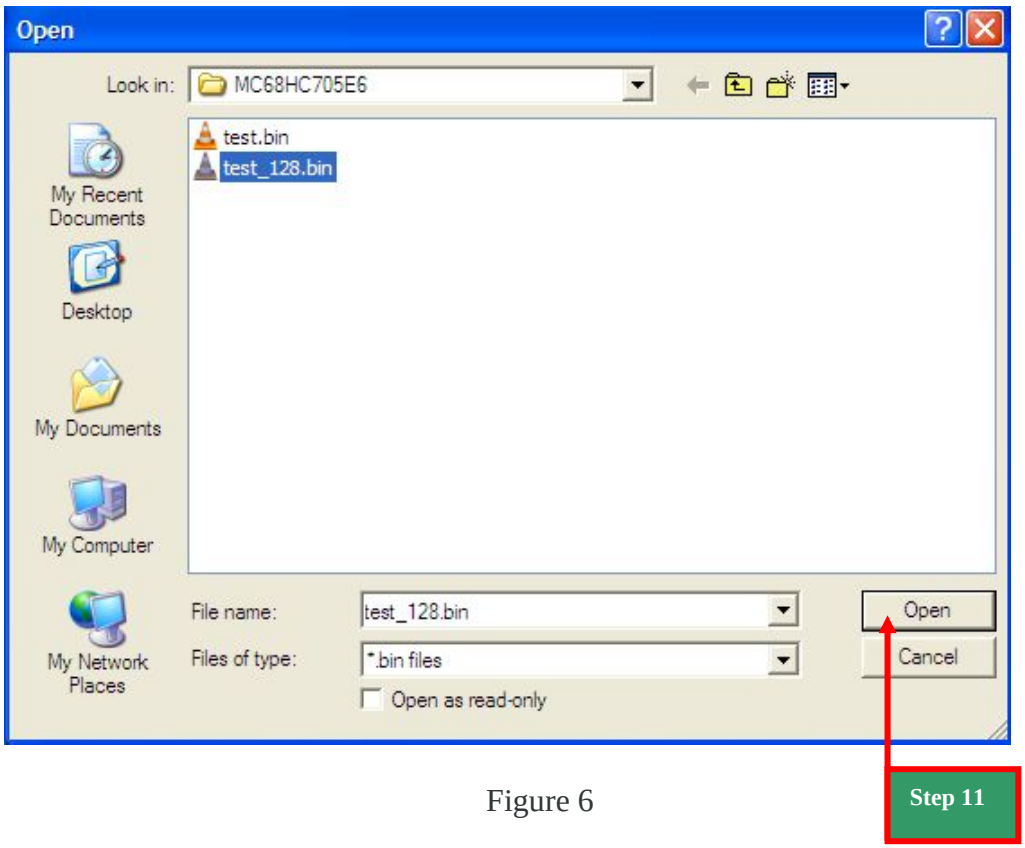


Figure 6

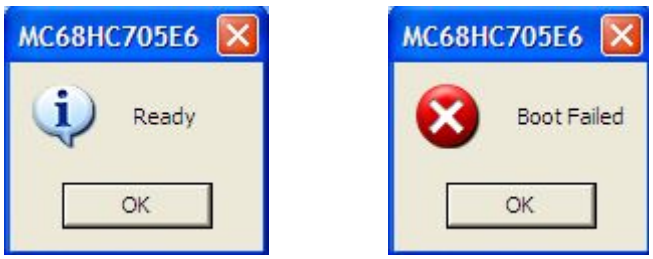


Figure 7

Boot respond passed (left side); Boot respond failed (right side)

Use step-by-step procedure to enter AUTONOMOUS MODE

First of all, make sure that PC jumper is mounted, before entering PC mode

Table 3

Operation mode	AU (Autonomous mode)	PC (Personal computer) mode
PC jumper	- open	- short

- Place a target microcontroller in the socket on your board according to 1-st pin orientation
- Check jumpers bar (Figure 8) and make sure that MCU type is correctly selected
  jumper JP3 or JP4 or JP5 or JP 6 must be mounted
- Apply 12 Volts to power jack or 2 ways connector

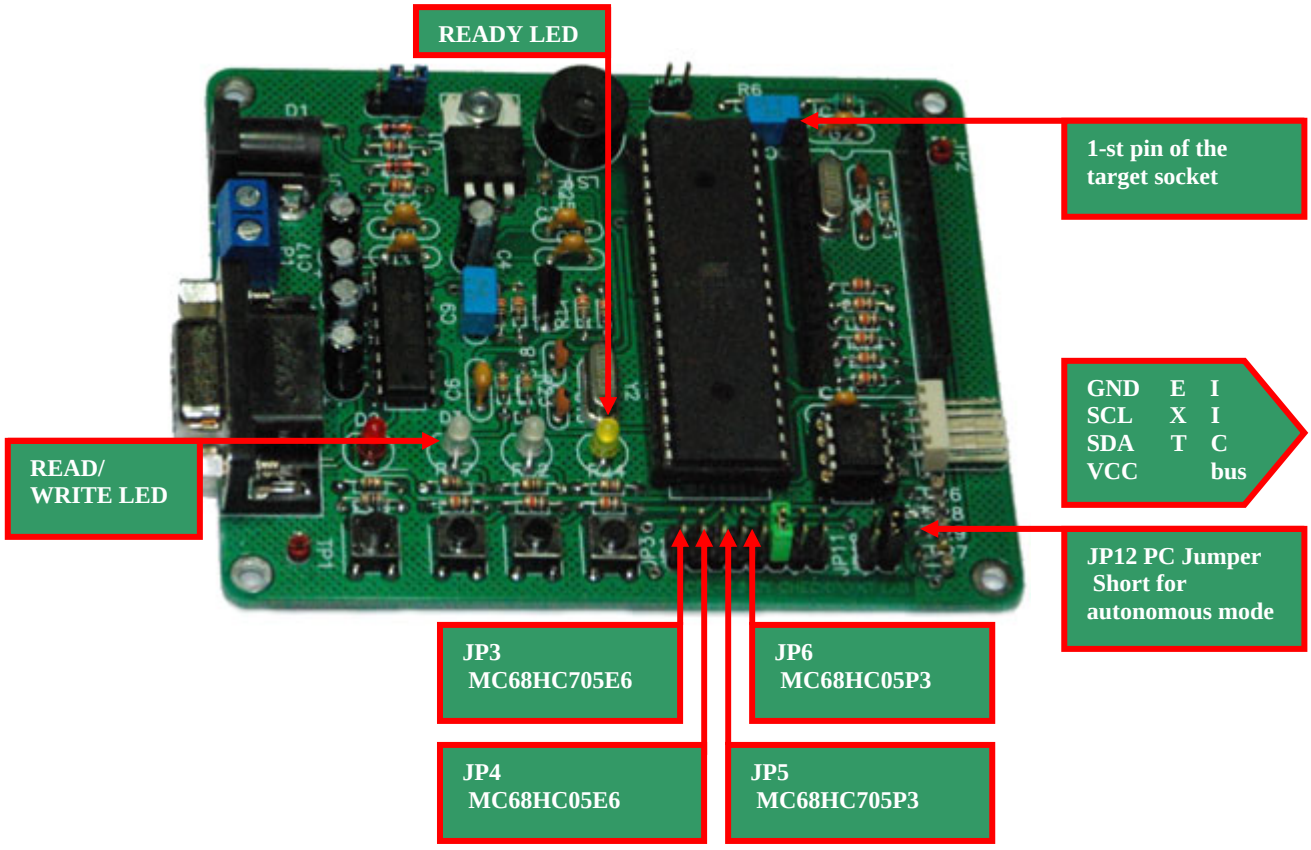


Figure 8

Read (Copy) from Microcontroller EEPROM memory to AT24C02 memory

1. Press **RESET button**
2. Press **READ button** and wait for the operation to complete. During “READ” operation two-color **READ/WRITE led** becomes flashing green colour. When operation is successfully completed **READY led** will flash 3 times to confirm the end of the operation
3. Read AT24C02 memory dump
4. Save the memory dump into a specified file*

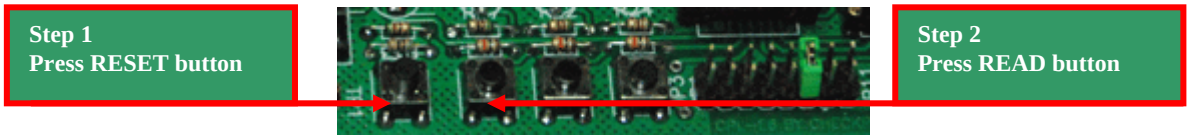


Figure 9

*Any suitable universal programmer can be used to access AT24C02 IIC memory

Write (Copy) from AT24C02 memory to microcontroller EEPROM memory :

1. Write AT24C02 memory dump according to particular task
2. Press **RESET button**
3. Press **WRITE button** and wait for the operation to complete. During “WRITE” operation two-color **READ/WRITE led** becomes flashing red. When operation is successfully completed **READY led** will flash 3 times to confirm the end of the operation
4. Press **VERIFY button** and wait for the operation to complete. During “VERIFY” operation **VERIFY led** becomes flashing green.

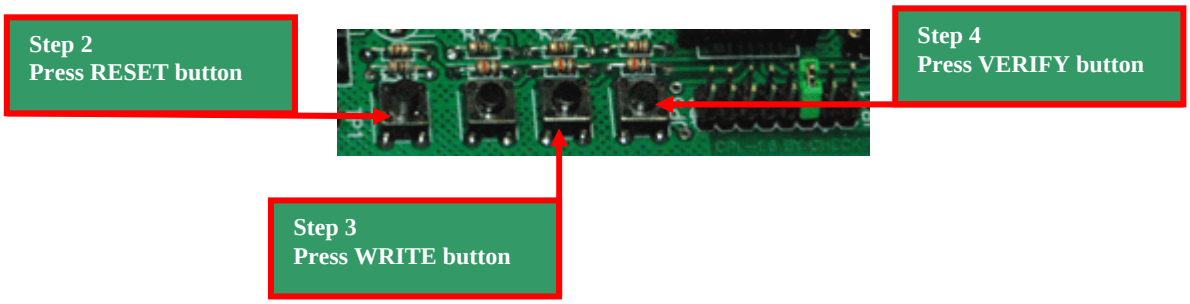
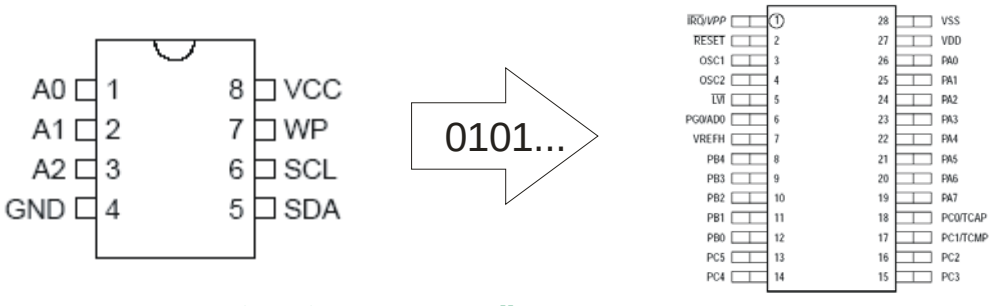


Figure 10

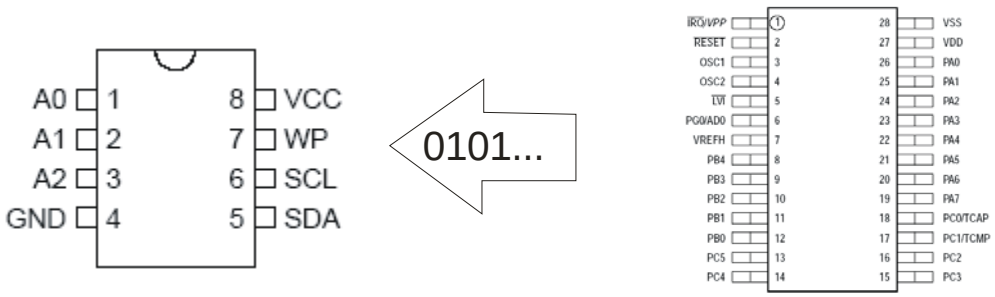
Errors:
- **READY/ERROR led** becomes solid red colour

Solution:

- Press **RESET button** again and repeat operation
- Check connection between target IC and MC68HC705E6 programming socket
- Check IRQ level (~ 10V; pin 1) of target IC



Write (Copy) to Microcontroller EEPROM memory



Read (Copy) from Microcontroller EEPROM memory

Figure 10

5. Troubleshooting guide

- Error message:
  Error Comm: Check Port Number/Cable/Turn ON Power Supply
- Cause:
  DC cable is broken, wrong power supply is used, no power, wrong cable
- Solution:
  Check or connect the serial cable to the PC COM port cable and connect the DC power cable to the DC jack or check that the power supply source is DC type 12-15 V, min. 300 mA

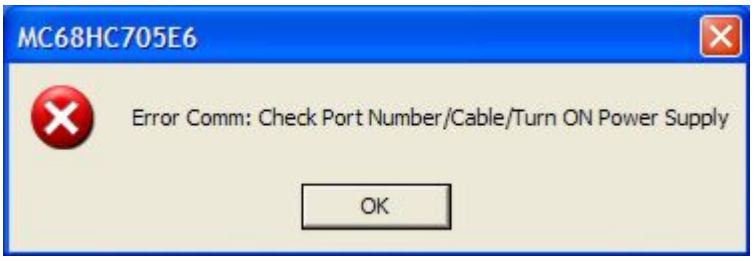


Figure 11

- Error message:
  Error Comm: Port Number Invalid
- Cause:
  Serial port does not exist on your PC
- Solution:
  Select correct serial port number

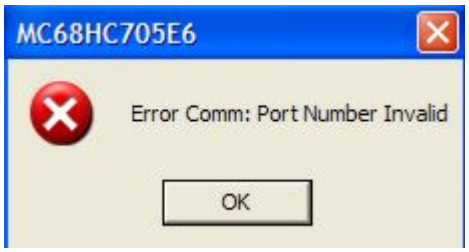


Figure 12

- Error beep signal (3 times):
  Write failed; Read failed; Boot failed
- Cause:
  Wrong MCU selection, wrong target MCU orientation, unexcepted error
- Solution:
  Check MCU type selection, target MCU orientation. Otherwise, repeat operation again (Write, Read or Boot)

Figure 13

APPENDIX 1

EEPROM of microcontrollers in memory map located:

MC68HC705E6:

The 160 byte block of EEPROM is located at address $0100 to $019F

MC68HC05E6:

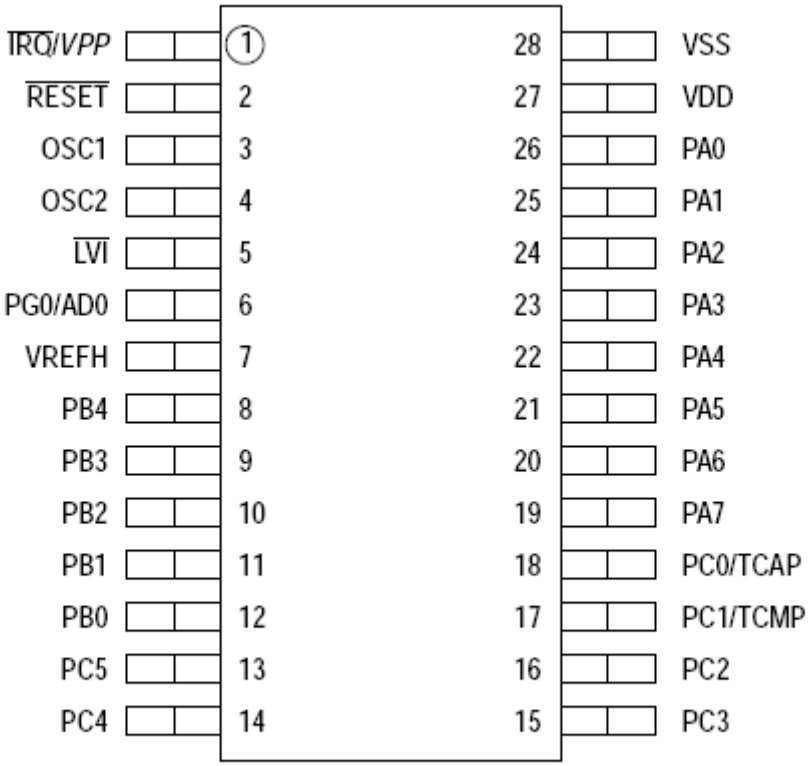
The 160 byte block of EEPROM is located at address $0100 to $019F

MC68HC705P3:

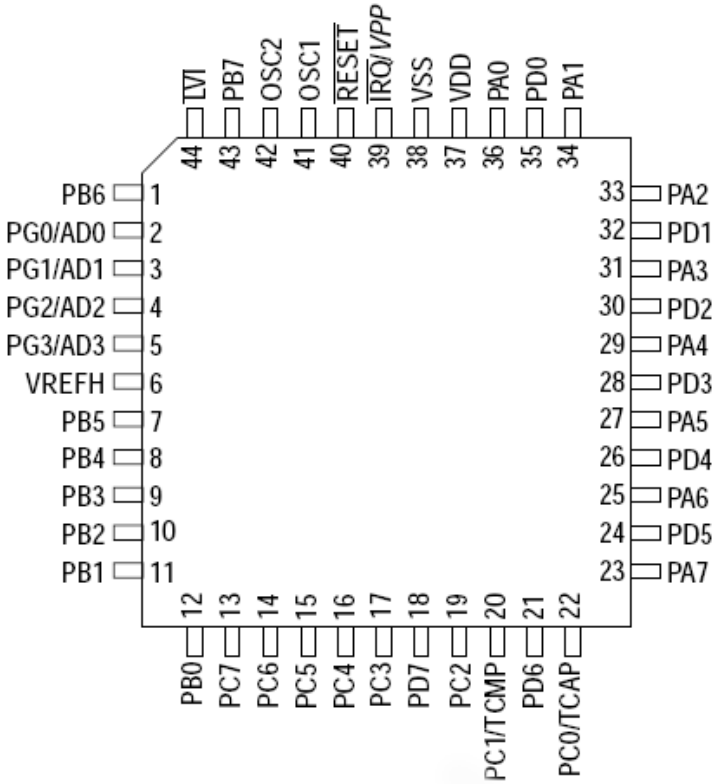
The 128 byte block of EEPROM is located at address $0100 to $017F

MC68HC05P3:

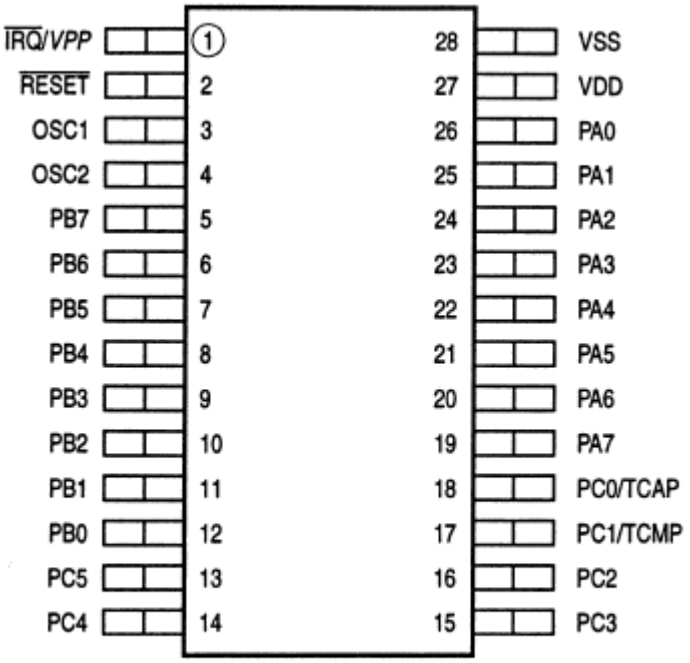
The 128 byte block of EEPROM is located at address $0100 to $017F



MC68HC7(05)E6 28-SOIC pin out Figure 14



MC68HC7(05)E6 44-pin QFP pin out Figure 15



MC68HC7(05)P3 28-SOIC pin out Figure 16

APPENDIX 2

MC68HC05P3 (1E25H) PROGRAMMING ADAPTER

MC68HC705E6 Programmer notice

Figure 17 shows the layout of the MC68HC05P3 (1E25BH) programming adapter. Resistors size is 1206. As shown in the figure there is special mode to configure MCU according to programming requirements. Before programming, make sure that MC68HC05P3 (1E25BH) is placed on corresponding programming adapter MC68HC05P3AD.

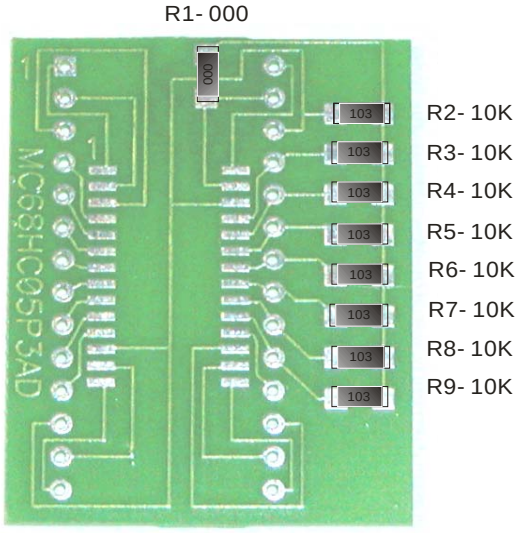


FIGURE 17

APPENDIX 3

Communication via Universal Serial Bus (USB):

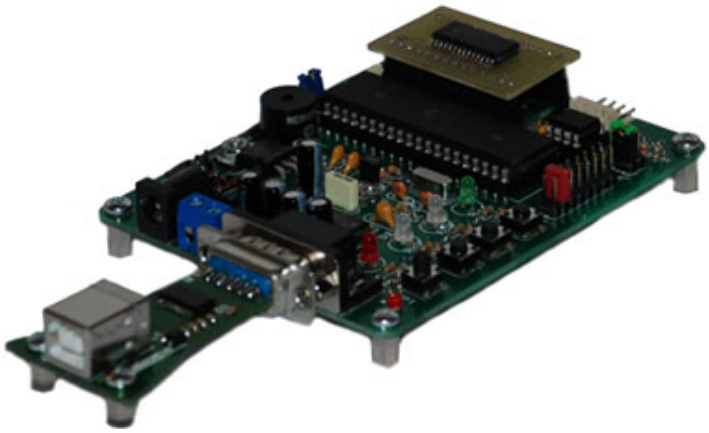


Figure 18

Special-purpose USB-RS232 converter required. The series-A plug: host PC. The series B-plug: USB-RS232 converter. Cable: Type - A to Type - B with maximum length 3 meters.